

RECOMMENDED PROJECTS

Some action items were categorized as “projects” based on the feasibility of getting them implemented. Considerations in determining feasibility included the degree of consensus, the amount of information available, the significance of potential benefits, the ability to minimize conflicts, permits required, urgency, costs, and available funding.

Table 1 lists the recommended projects and shows the page number where each is discussed in this chapter.

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Andrew Firebaugh Historical Park

The Andrew Firebaugh Historical Park Master Plan developed by the City of Firebaugh has not yet been implemented.

Background

For many years, the City of Firebaugh has owned 18.2 acres between the San Joaquin River and P Street, primarily north of Fresno/Madera Avenue. Although the site contains the remnants of the historical Firebaugh swing bridge, little attempt has been made to preserve it. In recent years, a number of problems at the site — fires, dumping, destruction resulting from children on bicycles and mopeds, for example — have adversely affected riparian habitat.

In the early 1990s, community interest in the park site was stirred because of its natural topography that allowed use as a community events arena once or twice a year. Because the temporary use was so successful, community leaders decided developing the park with a permanent arena and other facilities would meet a community need. They also determined there was a significant need for a riparian habitat restoration plan that would include a planting plan for the buffer area along the San Joaquin River and enhancing the rest of the site with riparian trees and shrubs. Proper development of the park would also preserve the historical resources and make natural resources available to benefit the community. Therefore, in 1993 the Firebaugh City Council retained Ono Design Inc. to prepare the Andrew Firebaugh Historical Park Master Plan.

Project

Primary components of the Andrew Firebaugh Historical Park are:

- A community events arena with permanent seating for 800 and that can accommodate temporary seating for 400. The arena will include grandstands, restrooms, concession stand, staging area, and parking lot. It will be used for events such as the annual Firebaugh Rodeo, square dances, farm equipment shows, high school band review and athletic events, farmers' markets, craft fairs, and community fund-raising events.
- A riparian habitat restoration plan that will encompass a planting plan for the buffer area along the San Joaquin River, enhancement of the remaining area of the park with riparian trees and shrubs, detailed plans for collection of planting materials, planting instructions, irrigation methods, success criteria, a monitoring plan, and proposed remedial measures should the success criteria not be met during the monitoring period.
- A 24-foot-wide multi-purpose trail designed to accommodate pedestrians, cyclists, and equestrians. The trail will be away from sensitive wildlife and historical areas.

Andrew Firebaugh Historical Park

- A 5-foot-wide nature trail, adjacent to the San Joaquin River, with interpretive and observation nodes.
- Preservation and enhancement of and access to remnant structures related to a historical drawbridge. A historical river crossing interpretive area is also included.
- A passive park area that includes an extensive natural grassland area for activities such as picnicking, bird-watching, and unstructured play.

Benefits

Andrew Firebaugh Historical Park will directly benefit the community by establishing the events arena, restoring and enhancing the riparian vegetation, and conserving historical resources. The multi-purpose trail will provide access through the park that can later be linked to public access trails north and south of the project site. The proposed nature trail will provide students and others with opportunities to study the sensitive riparian areas in a non-destructive manner.

Costs and Funding Sources

The City of Firebaugh owns the project site. Cost of proposed improvements is estimated at \$1,122,000. The city is seeking funding for the first phase of the master plan, the community events arena. Part of the cost for the community arena and associated riparian vegetation restoration plan will be borne by community groups. The city is seeking funding for the rest of the community arena project and other phases of the park plan.

Related Activities

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Potential Conflicts and Resolutions

There are no known project conflicts. Development of the park site is consistent with the goals and policies of the Firebaugh General Plan.

Implementation

Development of the park in accordance with the master plan is expected to be phased, with phasing dependent on availability of funding. Development of the community events arena will be the first phase. Implementing any phase would add valuable recreational facilities and opportunities to the Firebaugh community.

Aquatic Resource Database

San Joaquin Basin fishery and aquatic resource data are not readily accessible to resource managers, government agencies, and other organizations that rely on them to identify problems and make informed decisions.

Background

Data pertaining to San Joaquin Basin fishery and aquatic resources are in a variety of locations and formats. There has been no effort to catalog data, standardize formats, or to facilitate access and transfer between researchers, managers, and concerned citizens.

Project

Develop San Joaquin fishery and aquatic resources databases using standard protocols used by scientists, resource agencies, water districts, local governments, private firms, and individual citizens. This database could be patterned after the Bay/Delta database developed by water management and fishery agencies.

Benefits

A comprehensive database will expedite and improve the quality of research programs and management decisions pertaining to San Joaquin Basin fisheries and aquatic resources. It will also improve communication between agencies, interest groups, and the public. Access to data from past and existing studies and projects will prevent duplication of effort and improve efficiency.

Costs and Funding Sources

Costs are yet to be determined. Potential funding sources include the Central Valley Project Improvement Act.

Aquatic Resource Database

Related Activities

The completed database will be related to virtually all past, present, and future activities pertaining to San Joaquin Basin fishery and aquatic resources.

Conflicts and Resolutions

No significant conflicts are expected because improved access to the data would benefit all groups.

Implementation

Development would probably take 5 years but should be expedited if possible. Maintenance would be ongoing. No environmental documentation would be required. Legislation would be required if the State were to contribute to funding, because existing resources are not adequate.

Developing a truly comprehensive database would take cooperative effort between the U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, Department of Water Resources, Department of Fish and Game, universities, water districts, and private firms.

Atlas of San Joaquin River and Its Tributaries

Fragmentation, insufficient quantity, and lack of diversity of remaining riparian habitat is reducing species numbers and community diversity.

Background

Development of riparian protection and enhancement plans is hampered by a lack of knowledge of existing riparian areas, protected areas, urban areas, and zoning ordinances in the San Joaquin Basin. This deficiency also limits the ability to develop community plans consistent with riparian preservation goals.

Project

Prepare an aerial atlas using 1"=500' color photographs scheduled to be taken in 1994 by the Bureau of Reclamation. The atlas should show flood control facilities, the 100-year floodplain, major diversion facilities, riparian habitat, designated critical habitat areas, parcel numbers, State and Federal land along the rivers, reclamation and levee districts, and river miles.

Benefits

As a baseline document, the atlas would help the Action Team subcommittees find solutions to problems: for example, identifying areas where the riparian corridor is degraded or gone so restoration efforts can be undertaken.

Costs and Funding Sources

Costs are yet to be determined. Funding is available through the Central Valley Project Improvement Act, San Joaquin River Comprehensive Plan.

Atlas of San Joaquin River and Its Tributaries

Related Activities

This project should be coordinated with the Bureau of Reclamation, which completed an aerial atlas of the mainstem San Joaquin River in June 1994. This project will use existing biological surveys such as the San Joaquin Valley Endangered Species Recovery Planning Program, the DFG Wildlife Habitat Relations Database, Natural Diversity Database, and others.

Conflicts and Resolutions

No conflicts associated with this proposal were identified.

Implementation

This would be a new project and would be updated periodically.



Gravelly Ford, a dewatered reach of the San Joaquin River between Friant Dam and Mendota Pool.

Basin Flow and Delta Export Coordination

San Joaquin River mainstem and tributary flows are frequently inadequate for Chinook salmon to complete one or more phases of their life cycle. Diversions increase mortality of outmigrating smolts directly by entrainment and indirectly by altering habitat and increasing exposure to predation, high water temperature, and other risks.

Background

Reservoir management has altered the magnitude and timing of flows in the San Joaquin River and its tributaries. Providing adequate flows for spawning, incubation, and rearing is of less benefit if outmigrating smolts subsequently die because of low flows in the San Joaquin River or high export throughout the Delta. Managers of all projects must coordinate releases of water for Chinook salmon with other releases and water operations to ensure that conditions are optimal when salmon are in the rivers and Delta. The Department of Fish and Game has appointed San Joaquin Basin flow coordination. The focus of this effort is primarily fishery flow coordination. Delta project operations are not well coordinated with fishery flow improvements in the San Joaquin River.

Project

Establish better coordination of flows in the Stanislaus, Tuolumne, Merced, and San Joaquin rivers and exports at the Tracy and Banks pumping plants and Old River to facilitate migration and increase survival of Chinook salmon.

Benefits

If increased coordination of flows and exports proves feasible and is implemented, initial benefits will be increased survival of Chinook salmon during the freshwater portion of their life cycle and increased numbers returning to spawn in the Stanislaus, Tuolumne, and Merced rivers. This would provide angling and viewing opportunities in Stanislaus, Tuolumne, and Merced counties and associated benefits to the local economy. Substantial increases in escapement and survival would also result in recreational and economic benefits related to increased commercial and recreational harvest in the ocean. Coordinating flows and exports should maximize system efficiency and minimize additional water that might be required under the Central Valley Project Improvement Act or other instream flow agreements. If these measures prevent further decline in San Joaquin fall-run Chinook, they could help avoid listing the species under the Endangered Species Act and impacts on local property rights and economy that may result from such listing.

Basin Flow and Delta Export Coordination

Costs and Funding Sources

Costs are yet to be determined. Funding may be available through the Central Valley Project Improvement Act. Water transfers offer the potential to be self-supporting, including environmental monitoring costs.

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- Central Valley Project Improvement Act:
 - Anadromous Fish Restoration Program [3406(b)(1)].
 - Fish and wildlife restoration flows (800,000 acre-feet) [3406 (b)(2)].
 - San Joaquin River Comprehensive Plan [3406(c)(1)].
 - Unscreened diversions [3406(b)(21)].
- Department of Fish and Game's San Joaquin Basin Flow Coordination activities.

Basin Flow and Delta Export Coordination



Gravel extraction runoff into the San Joaquin River below Friant Dam.

Basin Flow and Delta Export Coordination

Conflicts and Resolutions

Conflicts will arise if altering timing of flow and exports reduces water available to users when they need it. This might be resolved by purchasing water from willing sellers, developing projects to augment the water supply, or increasing the amount of water in storage to enhance export flexibility. Water augmentation and additional storage facilities would, in turn, have to be evaluated in terms of potential detrimental effects on flow and habitat. In the long term, riparian restoration efforts could increase streamflow and reduce the volume of water released from reservoirs. Effective and efficient coordination of flows and exports may be a reasonable measure for salmon restoration and protection.

Implementation

This will be a multiple-agency effort among the U.S. Bureau of Reclamation, Department of Water Resources, U.S. Fish and Wildlife Service, Department of Fish and Game, and numerous water and irrigation districts. Management and coordination of flows will be ongoing. Existing streamflow allocation requirements and procedures would continue, with more formal coordination with Delta operations.

Environmental documentation would probably be required for some actions. Legislation may not be required for study but might be required to fund specific projects.

Channel and Spawning Gravel Work

Past activities such as mining and levee construction, in combination with water storage projects, have increased channel width and depth in some reaches of the San Joaquin River and its tributaries. This, in turn, has converted substantial areas from riverine to lake-like conditions. Reservoir storage and water use have resulted in channel constrictions in some river segments. A variety of past and present land-use practices contribute to excessive erosion and high concentrations of fine sediments that impact spawning riffles.

Background

San Joaquin Basin streams have changed a good deal in the last 150 years. Historical and current land-use practices such as gold mining and dredging, gravel mining, livestock grazing, agriculture, dams, diversions, urban development, fish introductions, and other activities have all contributed to today's conditions. Mining for gold and, more recently, gravel has drastically changed many of the salmon spawning grounds. Recent studies have found levels of fine sediments in riffles that can contribute to reduced egg survival. Other studies have documented high populations of introduced largemouth and smallmouth bass, both of which prey on young salmon. Abandoned gravel pits connected to the river flow, in combination with low flows and warm water, provide prime habitat for predatory bass.

Project

Identify areas in need of restoration and improvement:

- Channel and riffle location.
- Spawning areas to be cleaned by reducing fine sediments.
- Near-stream and watershed areas where erosion and sediment input need to be reduced.
- Abandoned gravel mine pits to be isolated from salmon nursery habitat.

Provide necessary funding to complete habitat projects already proposed.

Benefits

Improving gravel quality will result in increased survival of salmonid eggs. Channel improvements and enhanced riparian corridors and water quality reduce predation and thereby increase survival of salmonid juveniles. In combination with flow improvements and reduced losses during migration to the ocean, these projects can increase adult salmon populations.

Costs and Funding Sources

Costs will not be known until inventories and scoping of project designs are completed. The Department of Fish and Game has estimated \$8 million is needed for riffle and channel improvement in the Stanislaus, Tuolumne, and Merced rivers.

Channel and Spawning Gravel Work

So far, funding has been primarily from the DWR Delta Pump Mitigation Program, but CVPIA restoration funds and Tracy Pumps Mitigation Agreement funds may be available, as well as mitigation/enhancement funds from other agencies. Power projects and Propositions 70 and 99 are also possible funding sources.

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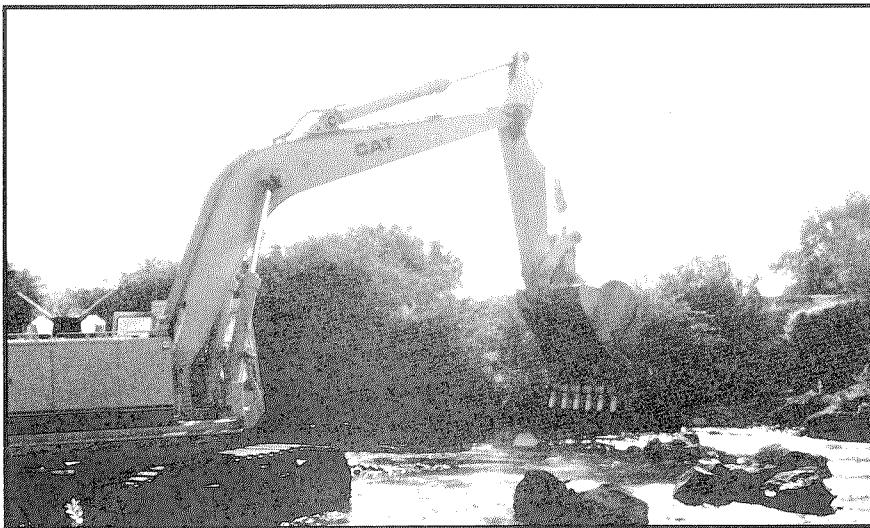
- San Joaquin River Management Program *Salmon Action Plan* Sections 3d, 3e.
- Central Valley Project Improvement Act Sections 3406(b)(1)(A), (c)(1), (e)(6).
- Department of Fish and Game *Central Valley Stream Action Plan*.

Conflicts and Resolutions

Landowners or users along streams or in other areas of the watershed may object. Resource conservation districts could assist in resolving landowner objections.

Implementation

This is an ongoing, long-term proposal. Some projects are already completed. Environmental documentation and permits will be required. Legislation could provide added funding, expertise, and authorization.



Creating weirs for spawning habitat in the Merced River below Crocker-Huffman Dam.

The Department of Water Resources and Department of Fish and Game are preparing inventories. The U.S. Bureau of Reclamation is preparing an aerial photo atlas. Some mining companies already have mitigation requirements.

Conjunctive Use Demonstrations

Accumulated salts in shallow ground water degrade surface water quality when they reach the channel of the San Joaquin River.

Background

In most years, excess salts accumulate in the soil and shallow ground water of the basin. Waterways and distribution systems are not managed with salt conveyance as a consideration; conveying salts with less harm to natural resources and humans is possible.

Project

During wet years, water from the eastern San Joaquin River tributaries could be distributed to areas where recharge rates and ground water quality are high. Then, during low-flow years, this high quality water could be extracted using shallow well fields. Local water users would use this supply rather than diverting from adjacent rivers, or the water could be delivered to areas normally supplied with more saline Delta-Mendota Canal supplies. If well water were used to replace surface water diversions, the high quality flows remaining in the stream would increase the assimilative capacity for drainage water and increase the flow and habitat available for fish. If the water were applied in areas otherwise supplied by the Delta-Mendota Canal, less salt would introduced to the basin from the Delta, for a net benefit to the salt balance.

Benefits

Beneficial effects on San Joaquin River water quality would be fairly small and would occur primarily in dry years following wet years.

Costs and Funding Sources

The costs of this proposal depend on:

- The scale at which it is applied.
- The degree to which existing or new distribution channels and well fields are used.
- The degree to which it interferes with existing use of those channels and well fields.

If the project is applied on a limited basis, administration costs would be high (several staff years annually), but facility and pumping costs would be small. At a more significant scale, administrative costs would increase somewhat, but facilities such as a new collector system to accumulate ground water and convey it cross-valley would cost several million dollars.

Potential funding could be from CVPIA restoration funds.

Conjunctive Use Demonstrations

Related Activities

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- Implementation of AB 3030 ground water basin management.

Conflicts and Resolutions

Lands best used for recharge are high-value cropland, now often used for orchards. Many trees cannot tolerate saturated soil in the root zone, even when dormant, so using orchards as water-spreading grounds would be a problem. Annual row crops could be grown on areas used for winter recharge, but the return to the farmer can be substantially less than from orchards, and leaching nutrients could increase farmers' costs.

Implementation

This is a long-term action because it would require time to assemble information on areas suitable for conjunctive use, to buy interests in land to permit operation of the ground water as a reserve, to install well fields, and to construct conduits to distribute pumped water locally or convey water to the Delta-Mendota Canal.

This would be a major action, with both positive and negative environmental and physical impacts, that would require an EIR/EIS. Water agencies have the authority to acquire land and develop conjunctive use facilities, so legislation would not be required. Legislation should be pursued, however, to help identify additional problems, costs, and benefits.

The most likely implementing agency would be the U.S. Bureau of Reclamation under its authority to acquire land and water to meet needs of the Central Valley Project Improvement Act.

Dissolved Oxygen and Circulation Solutions

Dissolved oxygen in the San Joaquin River near Stockton is depressed by high biochemical oxygen demand and poor water circulation during the fall low-flow period.

Background

The source of the high BOD (*biochemical oxygen demand*) is not fully characterized. Since 1969, the problem has been addressed by installing temporary barriers in the fall to divert San Joaquin flows down the mainstem instead of toward the CVP/SWP pumping plants and flow augmentation through release of stored water. Barriers at the head of Old River direct enough well-oxygenated water to permit fish passage through the reaches where BOD is high. However, the fall barrier may cause a water supply and quality problem for those who divert water from Old River and Middle River downstream late in their growing season. In the absence of adequate San Joaquin River flow at Vernalis, saline inflow and stagnant conditions are a problem in the southern Delta if a barrier is built exclusively for fish passage.

Project

Permanent channel structures and adequate streamflows are needed in the Delta to manage the flow and maintain the water surface elevation.

Benefits

A properly managed system of permanent barriers and flows would benefit water quality by routing high salt loads down the mainstem, where they would be blended with the Delta pool and a portion of them carried out of the basin to the Pacific Ocean. Without a permanent barrier system capable of operating during irrigation season, nearly all salts coming down the San Joaquin River are captured by CVP and SWP pumps and recirculated to the valley. The actual benefits and impacts to fish have not been well documented due to the absence of adequate test flow conditions.

Costs and Funding Sources

The Department of Water Resources, U.S. Bureau of Reclamation, and South Delta Water Agency have estimated the costs of Delta barriers, but the costs of provisions to satisfy water quality and endangered fish requirements have not yet been determined.

Funding is expected to come from State Water Project Contractors (as part of an agreement with South Delta Water Agency) and possibly from the Central Valley Project Improvement Act.

Dissolved Oxygen and Circulation Solutions

Related Activities

Evaluating the prudence of this project would rely on results of pre-project barrier installations, acoustic fish barrier studies, and fish migration and survival studies.

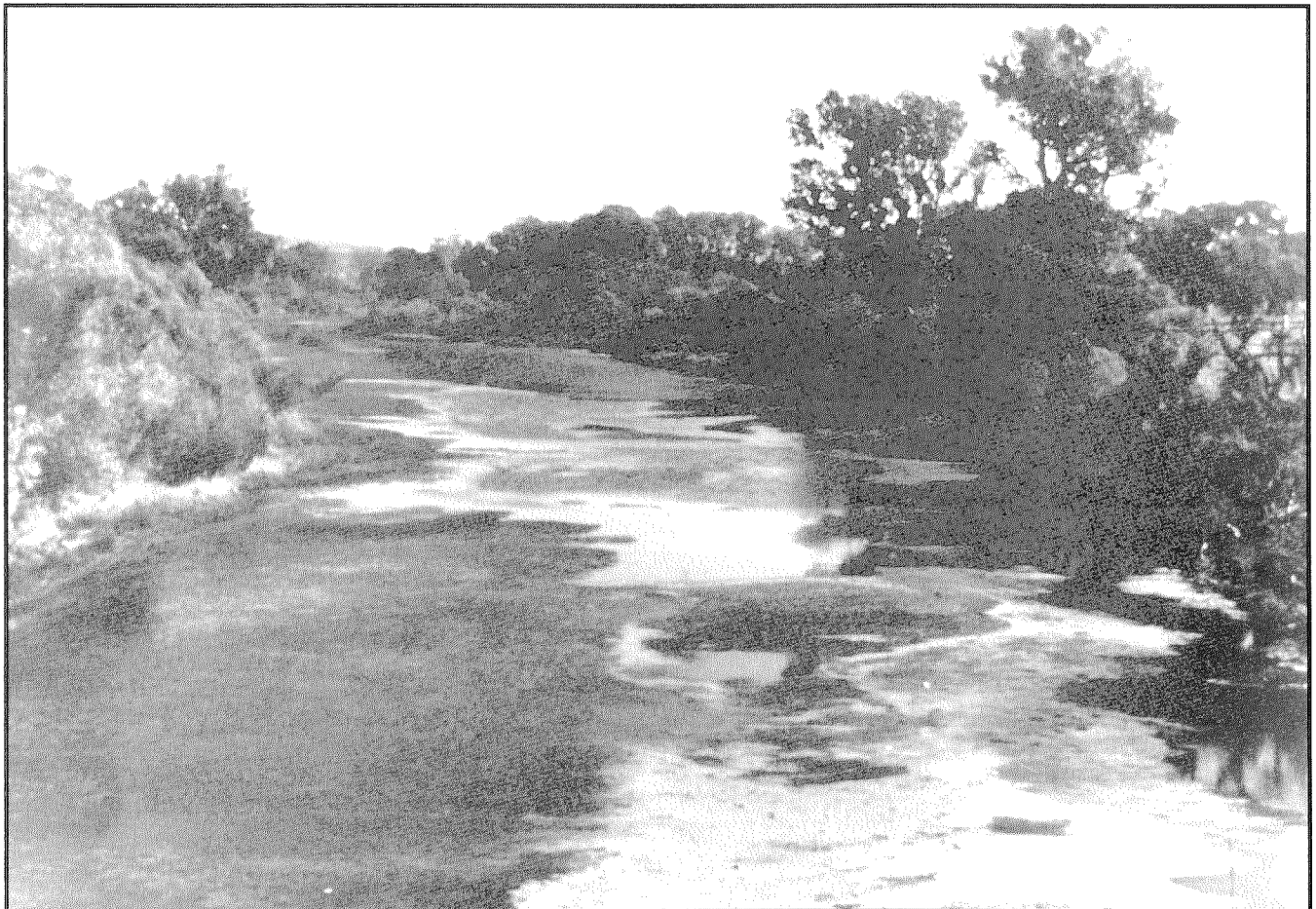
Conflicts and Resolutions

Fish transit studies with a full range of test flow conditions are needed to assess the effectiveness of barriers at diverting downstream-migrating salmon through the Delta. Impacts of Delta barriers on resident fish are unknown.

Implementation

This is a long-term solution, but there has already been significant effort to develop such a system. Results of pre-project studies are crucial to define the scope of the final project. A draft EIR is being prepared. No new legislation would be required except for budgetary authorization.

Probable implementing agencies are the Department of Water Resources and U.S. Bureau of Reclamation.



Algae growth during low summer flows in the Tuolumne River.

Drainage Management — Isolated Drain Routed to Below Merced River Inflow

If agricultural drainage water is conveyed through natural channels, salts in high concentration may alter vegetation, soil properties, and habitat productivity. In addition, toxic trace elements may accumulate in tissues of plants and wildlife and, through biomagnification, cause concern for the health of human consumers of fish and wildlife.

Background

Several agricultural districts between Mendota and Los Banos (north of Westlands Water District and south of Grassland Water District) have historically discharged drainage through Grassland's water supply canals and to two sloughs tributary to the San Joaquin River. This system threatens wetland water supplies due to high selenium levels in the drainage water. The San Joaquin Valley Drainage Program recognized the need to isolate drainage water of parts of the Delta-Mendota Canal service area that drain into the San Joaquin River from wetland supplies and to discharge it where assimilative capacity is adequate. Drainage water formerly produced in areas without access to the partially completed San Luis Drain has been controlled in the short term by several temporary expedients like fallowing, ponding, increased salinity in ground water and modified cropping patterns. The only discharge point for drainage water now being produced is via natural channels to the San Joaquin River. Since there is little assimilative capacity in the river at this point, humans, fish, and wildlife are exposed to hazardous material contained in the drainage water. The only areas with high assimilative capacity are downstream of significant tributaries from the east side of the basin.

Project

Extend the San Luis Drain to the San Joaquin River downstream of the Merced River, where assimilative capacity is greater and generally sufficient for the selenium load in the drainage water. This should eliminate the risk to wetland supplies and improve water quality in significant reaches of the San Joaquin River and tributary sloughs. Flows in the tributaries fluctuate significantly from day to day, so flow and selenium load in the drain would need to be regulated to match the fluctuations in assimilative capacity.

Benefits

Isolating drainage from natural channels would reduce the risk of toxic exposure by humans, wildlife, and fish. All the wetlands in Grassland Water District would be at reduced risk of contamination if this proposal were implemented.

Drainage Management — Isolated Drain Routed to Below Merced River Inflow

Costs and Funding Sources

Estimates of construction costs could be based on costs of existing portions of the San Luis Drain. Constructing a wildlife-safe reservoir to regulate releases into the San Joaquin River would increase costs significantly.

The most likely funding source is the U.S. Bureau of Reclamation. Drainers have offered support as well.

Related Activities

Measures to reduce drainage volume and control the releases on a field-by-field basis would complement this proposal and might reduce the cost and size of a regulating reservoir near the source of the drainage.

Conflicts and Resolutions

The intent of an isolated drainage facility is to prevent toxic materials or salts in drainage water from entering the food chain for wildlife and humans or damaging crop land. In concept, using an isolated drain to convey drainage water, instead of natural sloughs that are also used for wetland water supply and fishing, would reduce the threat to wildlife or public health. Removal of drainage water from the sloughs and subsequent diversion of limited fresh water will impact aquatic resources sustained by the sloughs. Capability to regulate releases of drainage supplies consistent with changing assimilative capacity of the river must be increased.

Implementation

Drainage interests have proposed a first-phase, 5-year trial of the idea. In the first phase, only the existing portions of the San Luis Drain are used. The drain now extends only to Mud Slough (north), about 8 miles short of a discharge point below the Merced River. An EIR/EIS might have been required to address alternatives considered, to avoid or reduce adverse impacts on the environment for the first phase of the proposal, and to identify cost-sharing responsibility. The Bureau of Reclamation has addressed these concerns in a Finding of No Significant Impact¹. Also, drainers have committed not to increase salinity in the San Joaquin River, to monitor drainage, and to provide funding. If a government agency were funding the proposal, legislation would likely be required.

Implementing agencies would probably be the U.S. Bureau of Reclamation, State Water Resources Control Board, Regional Water Quality Control Board, and Grasslands drainers.

¹ U.S. Bureau of Reclamation. 1990. *Finding of No Significant Impact for Use of the San Luis Drain Project*.

Drainage Management — Real-Time

San Joaquin Basin soils are accumulating salt and trace elements due to an imbalance between influx and outflow, with resulting problems for crop production, fish and wildlife. The problem is worse during drought.

Background

Near-surface ground water in some parts of the San Joaquin and Tulare Lake Basin has high concentrations of salt and toxic trace elements. In many areas, tile drains have been installed to allow the near-surface water to drain into facilities that eventually discharge to the San Joaquin River.

Project

Control the outlets of tile drain systems and store, blend, or recirculate their discharge so as to hold up salts and trace elements. Regulate discharges from problem areas.

Benefits

Installing discharge control and storage systems on tile drains would enable land operators to modulate discharges to the San Joaquin River.

Costs and Funding Sources

Costs have been estimated in studies and reports by the State Water Resources Control Board¹ and Regional Water Quality Control Board² following SWRCB Order WQ-85-1 and a report financed by South Delta Water Agency³.

Related Activities

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Conflicts and Resolutions

Controlling the discharge of tile drain systems seriously reduces their effectiveness in preventing damage to crops and soil. On the other hand, beneficial uses downstream of the discharge are impaired unless discharges are controlled. There may be no equitable way to deal with this problem, but it seems fair to require that tile drains discharge when the assimilative capacity of receiving waters is greatest.

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- 1 State Water Resources Control Board. August 1987. *Technical Committee Report on Regulation of Agricultural Drainage to the San Joaquin River*. Also Appendices A through J.
 - 2 Central Valley Regional Water Quality Control Board. October 1988. *Amendments to the Water Quality Control Plan for the San Joaquin Basin (5C) for the Control of Agricultural Subsurface Drainage Discharges*. Staff Report.
 - 3 William R. Johnston and Gerald T. Orlob. May 1993. *A Preliminary Plan for the Management of Water and Salt Flowing into the San Joaquin River from the Draining Entities on the West Side of the San Joaquin Valley*. Prepared for South Delta Water Agency.

Drainage Management — Real-Time

Implementation

If water quality regulators imposed and successfully enforced strict water quality objectives at the point of drainage discharge, there would be an immediate short-term impact on agricultural operations.

No EIR would be required (although one might be prepared), because the State Water Resources Control Board¹ has already prepared a functionally equivalent document on regulation of drainage to the San Joaquin River. Legislation would not be necessary, but the Legislature would probably have to give budgetary approval to implement an SWRCB Order, or budget language might refer to the State Board's authority.

This is an area squarely within the authority of the State Water Resources Control Board and the Regional Water Quality Control Board.



Confluence of the Merced and San Joaquin rivers at Hills Ferry Road bridge. The San Joaquin, at the bottom of the picture, is primarily agricultural drainage water.

¹ State Water Resources Control Board. August 1987. *Technical Committee Report on Regulation of Agricultural Drainage to the San Joaquin River*. Also Appendices A through J.

Drainage Management — Recirculation of Wetland Return Flows

San Joaquin Basin soils are accumulating salt due to an imbalance between influx and outflow, with resulting problems for crop production, fish, and wildlife. The problem is worse during drought.

Background

Wetlands flooded in spring for waterfowl habitat represent a storage opportunity, and some of these areas will be provided an increased supply under the Central Valley Project Improvement Act. Water stored on Westside wetlands would start with a lower concentration of salt if it originated from Friant Dam. Water stored on wetlands over the winter becomes more saline and, when drained abruptly to the San Joaquin River, salt concentrations have been a problem for agricultural areas downstream. The new supply could also be coordinated with fishery flows and Delta agricultural concerns.

Project

Water drained from the wetlands would be pumped to the Delta-Mendota Canal instead of being released to the river. Once in the canal, the water would be blended and delivered for irrigation.

Benefits

The salt balance would improve considerably if the increased supply to wetland areas came from the San Joaquin River watershed, because it would reduce the salt load imported from the Delta. Any incremental salts would be a small part of the much greater load in the Delta-Mendota Canal. Pumping water from wetland storage to the canal would have only a minor cumulative effect on the salt load and would provide a short, potentially useful delay in that portion of the total salt load reaching the river. If the load could be delayed long enough to coincide with augmented fish releases, which normally lag wetland releases by a few weeks, overall water quality fluctuation would be reduced.

Costs and Funding Sources

Costs of diversion structures, wetland delivery systems, and drainage facilities are addressed in the *Refuge Water Supply Investigation*. Channel modifications to address downstream effects are about the same as those to construct barriers in the southern Delta.

Funding might come from water, fish, and wildlife agencies or CVPIA restoration funds.

Drainage Management — Recirculation of Wetland Return Flows

Related Activities

Channel modifications need to be coordinated with fish-flow releases, Friant operations, and Delta channel modifications so delayed timing of salt transport does not conflict with water supply quality needs.

Conflicts and Resolutions

Barriers in the Delta would deflect San Joaquin drainage flows away from irrigation intakes, replacing highly saline water with Delta water that blends San Joaquin water with water having lower salinity and trace element levels. Fish migrating out of the basin could benefit by these structures. Wetland discharges would be recirculated into Delta-Mendota Canal, so salts and trace elements from the wetlands would be delayed a couple of weeks before accreting to the San Joaquin River. That time should be adequate to coincide with spring releases from eastside reservoirs for fish transport, which is a major blending opportunity. Fish entrained in the transport flows are vulnerable to export pumping unless barriers direct them down the mainstem San Joaquin. The overall increase in San Joaquin flows would address a concern of advocates for endangered fish who wish to see the San Joaquin River contribute to Delta outflow. The project would significantly benefit wetlands and moderately benefit fish and downstream water users but at the expense of Friant water users. That could be slightly offset if Friant service area deliveries could be made from the Mendota Pool.

Implementation

This is a long-term proposal because it would take several years to plan and construct pumps and a conveyance system from the wetland storage area to Delta-Mendota Canal, and it would also take some years to arrange delivery of Friant water to the wetland areas.

This major project would be subject to CEQA and NEPA, but many of the elements have been addressed in prior environmental documents and could be recapitulated in the CVPIA EIS.

No new legislation would be required to approve this proposal, but it is not clear whether the physical facilities could be built without legislation authorizing and appropriating the funds.

Because of the equal importance of fish, water supply, wildlife, and water quality issues, the implementing agency would need to be a multi-objective authority or agency.

Drainage Management — San Joaquin River Recirculation

San Joaquin Basin soils are accumulating salt due to an imbalance between influx and outflow, with resulting problems for crop production, fish, and wildlife. The problem is worse during drought.

Background

Virtually all San Joaquin River flow is recirculated now, with the flow past Vernalis generally equal to or less than the volume pumped by the CVP/SWP pumping plants. This leads to salts accumulating in the system. As salts accumulate, users will eventually become financially insolvent, and salts will accumulate until there is a means to convey them out of the basin. The river is such a means, but its best use requires much better coordination and improved facilities and operation.

Project

Increase the efficiency of basinwide management of available water and efficiency of application so that less of the water available for irrigation is consumed. Increase control of surplus flows in wet years to increase the load of salt they transport from the basin. Install barriers to reduce the amount of San Joaquin River water conveyed to the CVP/SWP pumps so that some becomes part of Delta outflow.

Benefits

Reducing the recirculation of drain water and permitting some San Joaquin River water to contribute to Delta outflow will help restore a favorable salt balance and will benefit fish and lower basin agricultural uses.

Costs and Funding Sources

See cost estimates for related activities.

The only incremental cost would be to coordinate and encourage implementation of other proposals, which might call for a small staff. An example of appropriate staff size is the Water Quality Subcommittee: about five people with a good understanding of the agencies involved, operation of the system, and data available. This could be administered for about \$300,000 annually.

Potential funding might be from any water agency obligated to solve Delta water supply or water quality problems. A number of water quality grant and loan programs might be tapped to fund water quality improvement facilities. Because a stable staff is essential, the best source would be operators of water projects in the contributing or affected areas.

Drainage Management —San Joaquin River Recirculation

Related Activities

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Salt Export Enhancement — Wet-Year Water Delivery Manipulations	98
Drainage Management — Irrigation Management	124

Conflicts and Resolutions

Irrigation efficiency has already been increased as a result of drought-induced water supply restrictions. Recycling has been adopted at the farm level but needs to be coordinated because when only on-farm considerations are involved, system water quality is damaged. When wetlands water supply is increased substantially, added coordination will be needed to prevent the wetland drainage from aggravating water quality problems and to ensure the wetland water augments supplies, improves fish passage, and contributes to salt balance restoration by contributing to Delta outflow. Without thoughtful coordination, these measures could degrade water quality.

Implementation

This is a long-term project because decreasing the amount of recirculation will profoundly damage existing users in the short term.

This project relies on changes in operations and improved facilities that would require an EIR/EIS. Coordination of information and operations would not require environmental documentation. Legislation might not be needed to authorize improved facilities and coordination, but the legislature would need to appropriate funds to prepare environmental documents and to establish a staff to implement the project.

The most likely implementing agency would be the Department of Water Resources, which already has a small program established to implement the Interagency Drainage Program.

Dual-Purpose Floodway Proposal

The floodway along the valley floor of the San Joaquin River is greatly deteriorated, both in terms of wildlife habitat and capacity to carry floodflows at non-damaging water elevations.

Background

The channel has been and continues to be substantially aggraded by sediments from tributaries, from inadequately controlled land use, and from bank erosion that removes high berms in the floodway and deposits the sediments in the channel. Since the river can no longer meander and spread over large areas at low velocities during high flows, the high berms are no longer replaced. Prolonged low flows resulting from increased water use permit vegetation to grow in the aggraded channel. These changes combine with agricultural, trailer park, and other developments to reduce floodway flow capacity, reduce habitat diversity, and destroy continuity of habitat along the floodway.

Project

Develop and implement a program to restore and maintain both the wildlife habitat and the floodflow capacity in the designated floodway of the mainstem, bypasses, and bifurcations of the San Joaquin River. The level to be restored and maintained would be that believed to exist at the time "design floodflow" capacities and stages were adopted by the U.S. Army Corps of Engineers and the State Reclamation Board for each reach of river. These objectives must be achieved in a balanced and compatible manner.

The program would consider widening the designated floodway, with easements obtained from willing sellers. Upstream or other river stages would not be increased. Peak river stages could be reduced by allowing overflow onto undeveloped land where easements can be willingly obtained. The program could restore a more continuous wildlife corridor, better wildlife escape areas, and habitat diversity in and along the floodway.

Benefits

To the extent possible, the proposal would stop the deterioration of the floodway, restore the level of protection intended when flood facilities were authorized, and restore and protect the floodway habitat that existed at that time.

Dual-Purpose Floodway Proposal

Costs and Funding Sources

Implementation costs cannot be estimated until a program is developed. The cost will clearly be substantial, but the program would probably be authorized and implemented in stages.

State and Federal funding will be required. It is not clear how local funding responsibility could be either determined or required.

Related Activities

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Restoration of Riparian Corridor	70
Sediment Removal from San Joaquin Mainstem	108

Conflicts and Resolutions

The program should not lead to trespass problems, increased public impact on private property, increased landowner liability, or interference with landowner water diversion rights and facilities. The program should not increase seepage onto adjacent lands and, in fact, should reduce seepage onto farmed and developed land outside the floodway. The program can include measures to reduce erosion either to preserve habitat and habitat corridors, to reduce jeopardy to levees, or to reduce channel aggradation. There will also be considerations of recreational access and fishery interests, although these should not be major concerns.

Potential public health impacts that could result from a possible increase in mosquito populations would need to be addressed.

Implementation

The program should be developed promptly and implemented over an extended period. Measures to stop deterioration are being expedited pending measures to provide restoration and long-term maintenance. An environmental impact report will be required, as will legislation.

Designating an implementing agency is a difficult issue in multipurpose projects. Possible implementing agencies could be the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, or The Reclamation Board.

Education Program — Recreation, Wildlife, Fisheries

Projects focused toward outdoor recreation or fish or wildlife use depend on public support for funding, visitation, and success. It is important to increase public awareness and education regarding the value of recreation and natural resources in the San Joaquin River system.

Background

Public information on the existence and value of recreation, fish, and wildlife resources is lacking. Few outdoor recreation programs are successful in the San Joaquin Basin, although some classroom curricula, such as *K-6 Salmon Teacher's Guide* for the "Salmonids in the Classroom" program and the *Habitat Fun Packs* curriculum guides distributed by the Central Valley Habitat Joint Venture, have begun to address this issue. Planning for any new facilities, projects, or programs must also educate the public to ensure support for appropriation of public funds, visitation, and coexistence with established activities and land uses including agriculture. It is State policy that varied educational and outreach programs be undertaken and information distributed about recreational opportunities to all segments of the population so that access is not limited by lack of information. This includes on-site enrichment through interpretation efforts and educational programs on the value of the outdoor experience.

Project

Develop an education program for citizens, landowners, public officials, planning commissions, and other agencies that will individually or universally address concerns and topics related to recreation, wildlife, and fish. An interagency San Joaquin Basin public relations network composed of government resource managers, public relations people, and educators should develop a program that will clearly explain the benefits and functions of an improved resource system. The network would have the primary goal of developing and distributing education materials to the public via classroom curricula, workshops, films, surveys, and pamphlets. Coordination with schools, museums, community groups and clubs, local news media, and other institutions would be a necessary outreach effort.

Benefits

Increased public awareness will result in the support and success of outdoor programs and improved ability to obtain voter support for actions to restore the San Joaquin River system resources.

Costs and Funding Sources

To be determined. Grant funding and assistance may be available. Existing funding commitments should be retained.

Education Program — Recreation, Wildlife, Fisheries

Related Activities

San Joaquin River Management Plan Recommendation	Page in This Report
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Tuolumne River Regional Park Plan	112

Other natural values including geology, hydrology, history, and the valley ecosystem can be stressed and included when applicable. Science program development with school districts and at the state level should be monitored to coordinate the San Joaquin Valley effort. Other related activities include:

- Tuolumne River Salmon Information/Education Center (La Grange)
- Bear Creek Conservation and Trust (near Merced)
- Grassland Environmental Education Center (Los Banos)
- Knights Ferry Visitor Center (U.S. Army Corps of Engineers)
- Great Valley Museum (Modesto)

Conflicts and Resolutions

The potential or perceived destruction of private property, littering, and disregard of the rights of private landowners to control land use are primary reasons for closing private lands for public use. Opposition to appropriating public funds to outdoor programs may stem from a lack of knowledge of all of the value and benefits such programs can bring to a community. Instilling greater understanding for resource and property values can help avoid actual and perceived problems with public usage impacts.

Implementation

This proposal can be developed and implemented within 2 years (short term) and continued for an extended period (long term).

Establish a San Joaquin Valley resource education consortium in 1995 to review existing programs (local, state, and federal) and develop consensus on goals and objectives for various subjects (for example, fisheries, wildlife, water quality, water supply). Coordinate goals and network among subject areas to enhance development of quality educational materials and reduce conflict wherever possible.

Exotic Vegetation Removal

Native terrestrial and aquatic plant species are being out-competed and displaced by non-native species.

Background

Native terrestrial and aquatic plant species compete with non-native species for water and space. In many cases, non-native species are more tolerant of human activities and adapt more readily to disturbed and altered environments. False bamboo is encroaching into the floodway in the upper reaches of the San Joaquin River near Fresno and in Middle River below Old River. Low growing plant species such as wild rose and blackberry would provide cover for wildlife and would not restrict flows excessively.

Project

Develop and implement a plan to remove false bamboo in the San Joaquin River and tributary channels and replace it with native vegetation compatible with flood control objectives.

Benefits

The project would increase habitat for small mammals and for both resident and migratory birds. In areas having large stands of exotic vegetation, removal would increase channel capacity.

Cost and Funding Sources

The first cost of replacing false bamboo with native vegetation would be about \$1,300,000. Periodic (about 5-year intervals) maintenance cost is estimated at \$69,000.

Exotic Vegetation Removal

Related Activities

As part of its Lower San Joaquin River and Tributaries Clearing and Snagging Project in the late 1980s, the Corps of Engineers did similar work but did not complete vegetation removal. The Fisheries and Recreation subcommittees are proposing removal of water hyacinth compatible with the goals of this action item (see "Exotic Aquatic Plant Control" in the Recommended Studies chapter.)

Conflicts and Resolutions

The Flood Control subcommittee is concerned about impacts of water hyacinth on flood control facilities. Actions to remove water hyacinth will be proposed by other subcommittees.

Implementation

This will be a new, long-term program.



False bamboo, an exotic, invasive, introduced plant found along waterways in the San Joaquin basin.

Fishing Regulation Enforcement

Illegal harvest of migrating and spawning adult salmon in the San Joaquin River and major tributaries may be detrimental to remaining salmon stocks.

Background

Legal harvest of Chinook salmon has been eliminated in the San Joaquin system upstream of Mossdale, but illegal take continues. The magnitude of the problem is not known, but it could severely impact salmon stocks in some years. Concentration of spawning adults in shallow riffle areas makes them especially vulnerable to capture. During years when few fish return to spawn, illegal capture could eliminate a high percentage of the remaining population and reduce spawning success and size of subsequent year classes. Habitat protection by enforcement staff is a year-round task in the San Joaquin tributaries.

Project

Increase the presence of enforcement officers in critical areas when adult Chinook salmon are migrating and spawning in the Stanislaus, Tuolumne and Merced rivers. Institute a program that includes public awareness and rewards to citizens who report illegal harvest and possession. Enforce other laws to protect all life stages of anadromous and resident fish.

Benefits

This action could increase salmon spawning success and the size of subsequent year classes.

Costs and Funding Sources

Cost estimates should be based on cost of required staff-hours for Department of Fish and Game wardens and effects on other activities. Costs of a reward program should be factored in.

Interim funding for this project has been approved through the "Four-Pumps" Agreement. The Central Valley Project Improvement Act may be able to provide additional funds.

Fishing Regulation Enforcement

Related Activities

This program will be important during years with low escapement, but its value in restoring Chinook salmon populations would probably be minimal without measures to improve habitat and increase survival of juveniles. Year-round enforcement is needed.

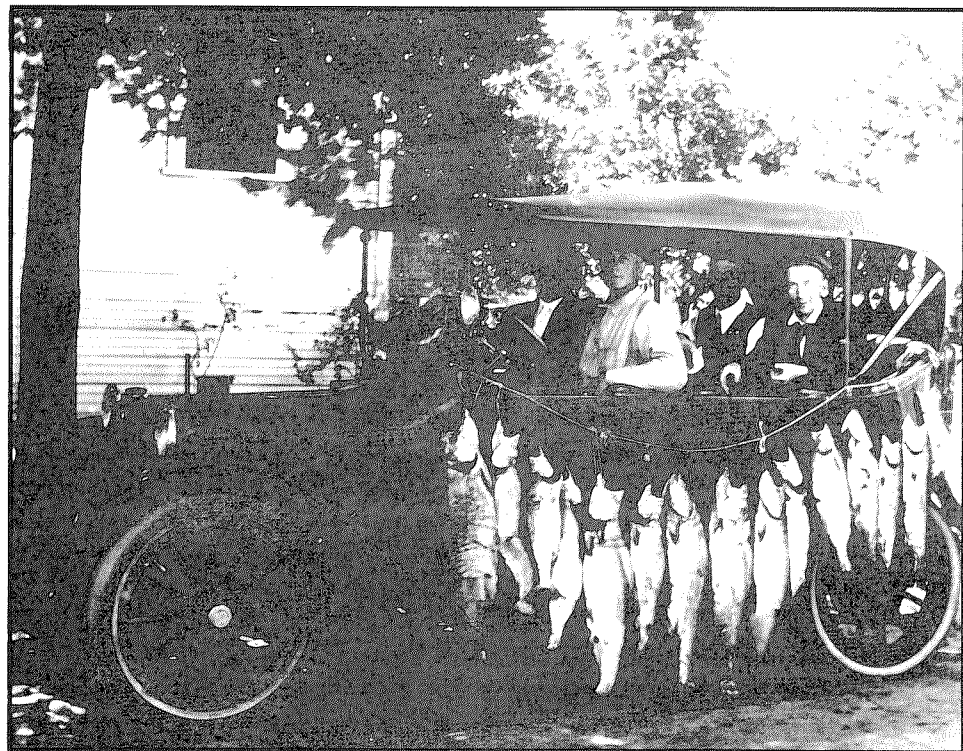
Conflicts and Resolutions

Conflicts between agencies and interest groups should be minimal, but staff and funding limitations could result in conflicts and competition with other wildlife enforcement programs and activities.

Implementation

To be effective, this project should be implemented as soon as possible. Duration will depend on the program's effectiveness and on future status of salmon stocks. No environmental documentation should be required. Legislation will be required if the State is to contribute funding.

This program would be implemented by the Department of Fish and Game, which has authority for enforcing California's fish and wildlife laws.



A day's salmon catch below the town of Friant in the early 1900s.

Friant Reservoir Release Schedule Revision

Flood releases from Friant Dam are a major cause of design floodflows and flood stages being exceeded in river reaches all the way to the Delta.

Background

Correcting this problem at the expense of Friant Reservoir water yield may conflict with San Joaquin River Management Plan principles. However, peak downstream releases could possibly be reduced by more sophisticated use of dedicated reservoir flood space, particularly during rain floods.

Project

Adjust the release rate at any given level of flood space encroachment depending on the rate of reservoir inflow and the direction of change in that rate. No change is proposed for release rates below 8,000 cfs and no change in the average release over a period of a week or two.

Benefits

The U.S. Army Corps of Engineers determined that this change could reduce peak reservoir releases during a 100-year flood by about 25 percent.

Costs and Funding Sources

Costs and funding sources have not been determined.

Related Activities

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Reservoir Flood Release Coordination	66

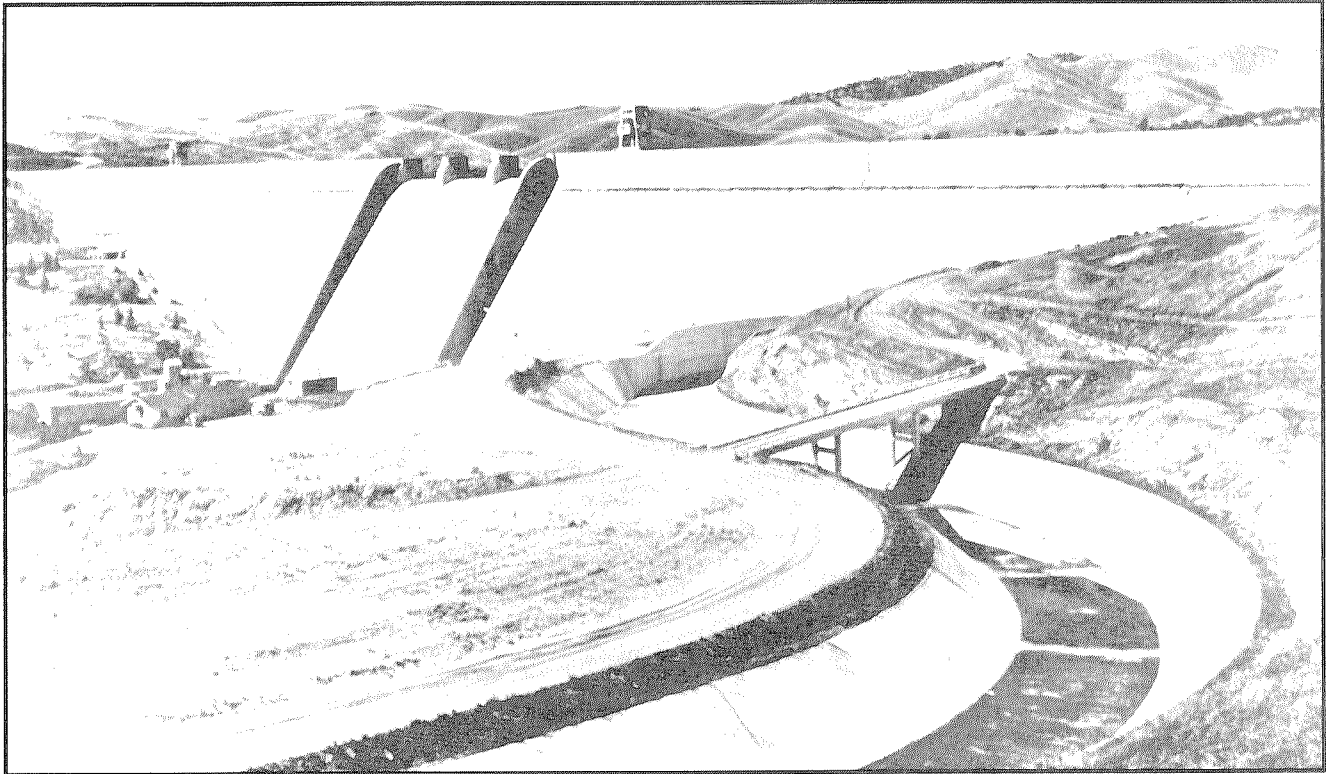
Conflicts and Resolutions

No conflicts have been expressed.

Implementation

This proposal was endorsed by the Advisory Council and accepted by the Corps of Engineers early in the San Joaquin River Management Plan process. The Corps of Engineers has prepared a revised reservoir release schedule but has not completed the required adoption process.

Friant Reservoir Release Schedule Revision



Friant Dam and the Friant-Kern Canal.

Genetic Maintenance

Although evidence suggests that San Joaquin Chinook salmon include one or more genetically distinct stocks, further research is needed. Hatchery practices, including inter-basin transplants and large releases of fry and smolt in the estuary, inadequate attraction flows, and other factors that result in straying of adult fish, may threaten the genetic integrity of these stocks.

Background

Homing behavior of Pacific salmon in general, the geographic and hydrographic separation from the Sacramento River, and the relatively late migration of fall-run fish into the San Joaquin system are believed to have restricted gene flow from other Central Valley fall-run Chinook stocks. Few tagged salmon from Sacramento drainage hatcheries have been recovered during San Joaquin escapement surveys.

Genetic research suggests that:

- California coastal and Central Valley Chinook salmon are genetically differentiated by drainage and river system (allozyme analysis).
- There is a high level of gene flow between Central Valley salmon runs.
- Despite high gene flow between populations, populations may remain genetically distinct (by measures including genetic distance, allele frequency, and unique alleles).
- Monitoring and preservation of variability and diversity of existing genetic resources should be strongly encouraged to ensure a full complement of adaptive capability into the future.

Project

Establish a “gene bank” to ensure protection of San Joaquin fall-run salmon genetic material in the event of catastrophic loss. Selectively harvest hatchery fish to encourage increases in wild stocks; this would entail marking all hatchery fish to allow identification in ocean and inland fisheries. Capture and breed wild San Joaquin fall-run salmon to enhance wild populations. Establish a genetic advisory committee composed of experts from academia and management agencies to guide management efforts.

Benefits

Studies underway will provide information about the status and distinction of San Joaquin Chinook salmon stocks. Recommended actions should increase naturally-produced stocks, provide insurance against catastrophic loss, and avoid possible listing of San Joaquin Chinook salmon under the Endangered Species Act.

Genetic Maintenance

Costs and Funding Sources

Costs and funding sources have yet to be determined. Marking of all hatchery fish can be accomplished with increased operating and temporary help allocation to existing budgets.

Related Activities

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- Central Valley Project Improvement Act:
 - Anadromous Fish Restoration Program 3406(b)(1).
 - San Joaquin River Comprehensive Plan 3406(c)(1).
 - Opportunities for Additional Hatchery Production 3406(e)(2).
 - Unscreened diversions [3406(b)(21)].

Conflicts and Resolutions

A genetic maintenance program could limit opportunities for increased hatchery production where such production is found to be detrimental to naturally-produced fish. It may be possible to resolve conflicts through modification of traditional hatchery practices and by modifying hatchery production to prevent adverse impacts on naturally-produced fish.

Implementation

Studies of the status of San Joaquin stocks will probably take 3-5 years or more to provide meaningful data. Captive breeding of San Joaquin stocks could require development of hatchery facilities, which will likely take more than 5 years.

Environmental documentation may be required for some activities. Legislation may be required to fund State participation.

The Department of Fish and Game and U.S. Fish and Wildlife Service will probably be the key implementing agencies.